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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,730	07/24/2003	Mikio Wakamiya	240564US0DIV	8065

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EXAMINER

HUYNH, ANDY

ART UNIT PAPER NUMBER

2818

DATE MAILED: 07/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/625,730	WAKAMIYA, MIKIO	
	Examiner	Art Unit	
	Andy Huynh	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/520,959.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>07/24/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

In the Preliminary Amendment dated July 24, 2003, Applicant has canceled claims **1-17** is acknowledged. Accordingly, claims **18-22** are currently pending in the application, which is a division of Application No. 09/520,959 filed March 8, 2000, abandoned.

Priority

Acknowledgment is made of applicants' claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in Parent Application No. 09/520,959, filed March 8, 2000.

Information Disclosure Statement

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed on July 24, 2003. The references cited on the PTOL 1449 form have been considered.

Drawings

The drawings are objected for the following reason.

Figures 1A-1B and 2A-2B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **18-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Figs. 1A-1B, Applicant admitted prior arts (AAPAs), in view of Inumiya et al. (USP: 6,294,481 hereinafter referred to as "Inumiya").

Regarding claims **18-19**, Figs. 1A-1B disclose and related texts as set forth in the Description of the Related Art, a method of manufacturing a semiconductor device comprises the steps of:

forming an insulating film (2) on a semiconductor substrate (1);
forming a conductive film/a polysilicon film (3) on the insulating film;
forming a boron-doped phosphorus silicate glass (BPSG) film (7); and
carrying out a heat treatment on the BPSG film.

Figs. 1A-1B fail to teach a method of manufacturing a semiconductor device comprises the steps of forming a nitrogen-containing oxide film over the semiconductor substrate, insulating film, and conductive film, and carrying out a heat treatment on the BPSG film in an oxidizing atmosphere.

Inumiya teaches in Figs. 1A-1J that a method for manufacturing a MOS transistor comprises the steps of forming nitrogen doped region (7) (Fig. 1G) over the silicon substrate (1) and the silicon oxide film (2) (col. 7, lines 3-9), and a nitrided silicon oxide film (gate insulating

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film) (8) is formed on the surface of the silicon substrate by effecting an oxidizing-nitriding process at 850° C (col. 7, lines 42-46). Inumiya further teaches that if the heat treatment is carried out in an oxidizing gas atmosphere containing nitrogen such as a dinitrogen monoxide gas, instead of a dry oxygen, hence, the penetration of boron can be further effectively prevented (col. 8, lines 4-6 and lines 14-15).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of forming a nitrided silicon oxide film (gate insulating film) on the surface of the silicon substrate by effecting an oxidizing-nitriding process and carried out in an oxidizing gas atmosphere containing nitrogen such as a dinitrogen monoxide gas, as taught by Inumiya, into the prior art of Figs. 1A-1B (AAPAs) to form a nitrogen-containing oxide film over the semiconductor substrate, insulating film, and conductive film, and carrying out a heat treatment on the BPSG film in an oxidizing atmosphere in order to prevent the boron from diffusion into the silicon substrate, and as a result, a high-speed transistor can be provided (col. 8, lines 36-40).

Regarding claims **20-21**, Figs. 1A-1B and Inumiya disclose the all claimed limitations in claim **18**, and Inumiya further teaches in Figs. 1A-1J that a method for manufacturing a MOS transistor comprises the steps of forming a silicon oxide film (5) (Fig. 1D) on the surface of a portion of the silicon substrate (1) which is not covered with the silicon nitride film (3) by use of a thermal oxidation method (col. 6, lines 47-51); and heat-treatment the thermal oxide film in a dinitrogen monoxide gas (N_2O) (col. 7, lines 42-46, and col. 8, lines 4-6). It would have been obvious to one of ordinary skill in the art at the time of the invention to form a thermal oxide film on exposed surfaces of the semiconductor substrate and conductive film, and heat-treatment

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the thermal oxide film in a dinitrogen monoxide gas (N_2O) to prevent the boron from diffusion into the silicon substrate, and as a result, a high-speed transistor can be provided (col. 8, lines 36-40).

Claim **22** is rejected under 35 U.S.C. 103(a) as being unpatentable over Figs. 1A-1B, Applicant admitted prior arts (AAPAs), in view of Tomita et al. (USP: 5,959,329 hereinafter referred to as "Tomita").

Figs. 1A-1B and Inumiya disclose the all claimed limitations in claim **18**, except for wherein the oxidizing atmosphere contains water vapor. Tomita teaches that an oxide film, which was oxidized in a water vapor atmosphere, in a so-called wet oxidizing atmosphere, has an insulation breakage life longer than an oxide film, which was oxidized at a temperature, in a so-called dry oxidizing atmosphere (col. 1, lines 49-54). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the oxidizing atmosphere contains water vapor in order to have a longer insulation breakage life as taught by Tomita.

Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the -status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.



AH

06/29/04



David Nelms
Supervisory Patent Examiner
Technology Center 2800